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AGRICULTURAL MEMORANDUM NO. 795
TEMPERATURES WITHIN SUGAR BEET CLAMPS - L P SMITH

In the early 1950s, an experiment was carried out at Kidderminster and Spalding, to measure the temperatures inside (commercial) sugar beet clamps, both uncovered and covered with straw. The main results and conclusions were as follows:-

There were four clamps at each station, two covered, two uncovered; temperatures (max. min. spot values) were measured at three positions in each clamp, one in the centre and one at each end, at approximately 1 foot depth inside the clamp at the middle of the sides.

As might be expected, the diurnal variation of temperature inside the clamp was damped down as compared to that in the open air; there was an internal timelag of maxima and minima of about 3-4 hours.

The variation from position to position within any one clamp was not great (generally 1-2°F), and the variation from clamp to clamp at any one position was almost negligible.

As far as could be ascertained, the relative humidity within the clamps was very close to 100% throughout the November to January period of observations.

Kidderminster

					Average Temperatures
Period	Nov 17-Dec 28	Time 0030	Clamp centre	Uncovered	42.0 and 42.4°F
				Covered	41.8 and 41.5°F
		Time 0830	NE end	Uncovered	42.1 and 42.9°F
				Covered	42.9 and 42.5°F
		Time 1630	SW end	Uncovered	43.4 and 44.1°F
				Covered	44.0 and 43.3°F
	Dec 29-Jan 11	Time 0030	SW end	Uncovered	39.8 and 40.6°F
				Covered	40.1 and 39.8°F
		Time 0830	Centre	Uncovered	37.9 and 37.9°F
				Covered	37.8 and 37.8°F
		Time 1630	NE end	Uncovered	39.6 and 39.8°F
				Covered	39.8 and 39.8°F

			Average Maximum Temperatures
Nov 17-Jan 11	SW end	Uncovered	44.6 and 46.4°F
		Covered	45.0 and 44.8°F
	Centre	Uncovered	43.4 and 44.0°F
		Covered	43.6 and 44.0°F
	NE end	Uncovered	43.6 and 43.9°F
		Covered	44.0 and 44.4°F
	Outside Air		47.2
	Difference outside-inside		0.8 - 3.8°F

Period Nov 17-Jan 11

		Average Minimum Temperature
SW end	Uncovered	39.5 and 39.6°F
	Covered	40.2 and 40.4°F
Centre	Uncovered	38.8 and 38.5°F
	Covered	38.5 and 38.7°F
NE end	Uncovered	38.4 and 38.5°F
	Covered	38.8 and 39.2°F
Outside Air		37.6°F
Difference Inside-Outside		0.8 - 2.8°F

Nights with Air Frost

SW end	Uncovered	33.9 and 33.1°F
	Covered	34.9 and 35.1°F
Centre	Uncovered	33.3 and 32.4°F
	Covered	32.6 and 33.2°F
NE end	Uncovered	32.3 and 31.9°F
	Covered	32.4 and 32.3°F
Outside Air		27.9°F
Difference Inside-Outside		4.0 - 7.2°F

There was thus a bigger change from end to end of a clamp than from covered to uncovered.

The arithmetical mean of maximum and minimum for all positions in all clamps was 41.7°F; that in the outside air was 42.4°F.

Spalding

Average Temperatures

Period Nov 25-Dec 8	Time 0200	SW end	Covered	42.8°F
		NE end	Covered	41.4°F
			Uncovered	41.4° and 40.8°F
	Time 0600	Centre	Covered	*40.3 and 42.0°F
			Uncovered	41.6 and 41.0°F

(Note * the 40.3°F was on the NW side, the others on the SE sides)

Time 1000	NE end	Covered	40.7°F
	SW end	Covered	40.7°F
		Uncovered	40.4 and 39.6°F
Time 1400	SW end	Covered	41.6°F
	NE end	Covered	41.7°F
		Uncovered	41.6 and 41.7°F
Time 1800	Centre	Covered	*42.4 and 41.6°F
		Uncovered	42.3 and 41.8°F
Time 2200	NE end	Covered	41.5°F
	SW end	Covered	41.7°F
		Uncovered	41.9°F and 41.1°F

Period Nov 11-Dec 8

Average Maximum Temperatures

SW end	Uncovered	47.4 and 47.8°F
	Covered	47.8 and 48.1°F
Centre	Uncovered	46.8 and 47.5°F
	Covered	48.3 and 48.0°F
NE end	Uncovered	47.0 and 47.4°F
	Covered	48.0 and 47.6°F
Outside Air		50.0°F
Difference Outside-Inside		1.0 - 3.2°F

Period Nov 11-Dec 8

Average Minimum Temperatures

SW end	Uncovered	42.6 and 42.5°F
	Covered	43.7 and 43.4°F
Centre	Uncovered	42.4 and 42.6°F
	Covered	43.4 and 43.4°F
NE end	Uncovered	42.3 and 42.5°F
	Covered	43.8 and 43.2°F
Outside Air		40.4°F
Difference Inside-Outside		1.9 - 3.4°F

Conclusions

The maximum temperatures well inside a beet clamp average some 2°F lower than those in the outside air.

The minimum temperatures average some 2°F higher in uncovered clamps and 3°F higher in covered clamps.

On frosty nights this rise in minimum temperature is approximately double, i.e. 4-6°F higher in the clamps.

The variations of temperature within a clamp are at least of the same extent as variations from clamp to clamp.

Any comments or suggestions on this paper should be referred to the author.

Meteorological Office
Bracknell

March 1976